

Frosts.—Occurred very generally in all states and territories north of the thirty-seventh parallel. In Florida they were reported on the 19th, 20th, 21st, 22nd, 23rd, 30th; Eastern Gulf States, 2nd, 3rd, 4th, 5th, 7th, 9th, 10th, 12th, 14th, 16th, 18th to 30th; Western Gulf States, 2nd, 8th, 11th, 18th, 19th to 23rd, 28th to 30th; Indian Territory, 2nd, 15th, 18th to 22nd, 29th; New Mexico, 2nd, 5th, 6th, 12th to 15th, 17th to 30th; heavy white frost in northern Arizona on the 12th; California, 1st, 7th, 8th, 10th to 28th.

Ice has been reported throughout all districts north of Tennessee and Kansas. In the Eastern Gulf States it formed on the 4th, 5th, 21st, 22nd, 23rd, 29th and 30th; In Western Gulf States, on the 4th, 18th, 19th, 20th, 21st, 29th; In Texas and Indian Territory, on the 18th, 19th, 20th, 21st, 29th; At Princeton, Cal., on the 18th and 19th.

Ground Frozen.—Ames, Ia. 27th to 30th; Nora Springs, Ia., 3rd; Tabor, Ia., 30th; Cedar Vale, Kan., 20th, 21st, 24th, 29th; Oregon, Mo., 18th, 19th; Ashley, Mo., 19th; Flushing, Wy., 3rd; West Charlotte, Vt., 1st, 2nd, 19th, 21st, 30th; Ft. Gibson, Ind. Ter., 19th, 29th; Keokuk, Ia., 19th, 29th; Springfield, Ill., 20th.

PRECIPITATION.

The general distribution of rainfall for the month is illustrated as accurately as possible on Chart No. III, from about 500 reports; this chart is accompanied by a table giving the average precipitation for the month of November by districts. This table shows the rainfall to have been decidedly below the normal throughout the Atlantic and Gulf States, and at Portland, Oregon. In the Middle Atlantic and Eastern Gulf States this deficiency amounts to more than two inches, and the severe droughts previously reported have continued throughout the present month from New Jersey to North Carolina, and in southern Texas. A small deficiency is reported in the Upper Missouri Valley and Minnesota. In the Lake region, Upper Mississippi, and Lower Missouri valleys there is a large excess, amounting in the last district to more than three inches. The combined reports from San Francisco and San Diego show an excess of nearly two inches, which is due to the heavy rains attending low areas Nos. IV and XVIII. Regarding the rain-fall in Missouri, Prof. Nipher states in the *Missouri Weather Review* that "the greater portion of the rain fell between the 10th and 20th, and was followed by a marked rise in the rivers; these rains occurred as frequent and moderate showers, and were of great benefit to fall crops, checking also the ravages of the Hessian fly.

Special Heavy Rainfalls.—3rd, Holton, Kan., 3.00 inches. 6th, Ft. Barrancas, Fla., 3.83 in. 8th, Howard, Neb., 2.44 in.; Leavenworth, 2.56 in.; Manhattan, Kan., 2.31 in.; Waterville, Kan., 2.00 inches in 8 hours. 9th, Okalooska, La., 5.20 in.; Los Angeles, Cal., 3.41 in.; Calistoga, Cal., 2.60 in.; San Diego, 2.75 in. 9th and 10th, San Geronio, Cal., 3.92 in. 10th, Pierce City, Mo., 2.00 inches in 2 hours and 40 min. 10th and 11th, Sterling, Ill., 3.40 in.; Holton, Kan., 2.75 in.; Howard, Neb., 3.50 in.; Plattsmouth, Neb., 3.58 in.; Lawrence, Kan., 2.65 in. 11th, Des Moines, 2.58 in.; Leavenworth, 2.58 in.; Guttenburg, Iowa, 2.60 in.; Litchfield, Mich., (10th to 12th) 3.00 in. 11th and 12th, Kansas City, Mo., 2.69 in.; Glenwood, Iowa, 2.95 in.; Thornville, Mich., 2.50 in.; Manhattan, Kan., 4.81 in.; Brookhaven, Miss., 2.60 in.; Waterville, Kan., 4.18 in. 14th and 15th, Arlington, Ind., 3.00 in. 15th, Vicksburg, 1.82 inches in 20 minutes. 17th and 18th, Murphy, N. C., 2.70 in. 18th, Thatcher's Island, 3.14 in.; Northport, Mich., 2.90 in. 18th and 19th, Fayetteville, N. C., 3.00 in. 27th and 28th, Highlands, N. C., 2.80 in. 28th, Vicksburg, 1.81 inches in 1 h. 20 min. 29th and 30th, Calistoga, Cal., 3.20 in.; Red Bluff, 3.15 in.; San Francisco, 2.24 in.; Princeton, Cal., 1.98 in.

Largest Monthly Rain-falls, including Melted Snow:—Mt. Washington, 9.53 inches; Savannah, Mo., 8.90 inches; Alta, Cal., 9.13 inches; Fort Barrancas, Fla., and Ironton, Mo., 8.72 inches; St. Joseph, Mo., 8.45 inches; Erie, 8.35 inches; Okalooska, La., 8.03 inches; New Hope township, Union county, Iowa, nearly 8.00 inches; Leavenworth, 7.85 inches; Manhattan, Kans., 7.83 inches; Oregon, Mo., 7.81 inches; Grafton, N. H., 7.70 inches; Holton, Kans., 7.65 inches; Litchfield, Mich., 7.25 inches; Calistoga, Cal., 7.24 inches; Grand Haven, 7.23 inches; Northport, Mich., 6.93 inches; Thatcher's Island, Mass., 6.91 inches; Milan, Mo., 6.72 inches; Centreville, Mo., 6.82 inches; College Hill, Ohio, 6.75 inches; Des Moines, 6.49 inches; Howard, Neb., and Grand Rapids, Mich., 6.46 inches; Port Stanley, 6.43 inches; Coldwater, Mich., and Quebec, Can., 6.36 inches; Independence, Iowa, 6.30 inches; Fort Leavenworth, Kans., 6.26 inches; Neosho, Mo., 6.22 inches; Niles, Mich., 6.14 inches; Madison, Wis., and New Corydon, Ind., 6.02 inches; Memphis, 6.01 inches; Pierce City, Mo., and Fort Wayne, Ind., 6.00 inches; Redding, Cal., 5.96 inches.

Smallest Monthly Rain-falls, including Melted Snow:—At Randall, Dak., La Mesilla, N. M., Concho Davis, Laredo, Rio Grande and Edinburg, Tex., none; Fort Hartsuff, Neb., Castrovillo and Stockton, Tex., trace; El Paso and Uvalde, Tex., 0.01 in.; Salt Lake City, 0.02 in.; Socorro, N. M., and Eagle Pass, Tex., 0.03 in.; Fort Abraham Lincoln, Dak., Fort Griffin, Tex., and Dodge City, 0.04 in.; Camp Sheridan, Neb., Boerne and Brackettville, Tex., 0.05 in.; Fort Stevenson, Dak., 0.06 in.; Olivet, Dak., 0.07 in.; Coleman, Tex., 0.08 in.; Fort Lyon, Col., Fort McPherson, Neb., and North Platte, 0.10 in.; Fort Keogh, Mont., 0.11 in.; Indianola, 0.13 in.; Pilot Point and Brownsville, Tex., 0.14 in.; Bismarck, 0.16 in.; Fort Sidney, Neb., and Castrovillo, Tex., 0.18 in.; Fort Custer, Mont., 0.19 in.; Denver, 0.21 in.; Yankton and Cheyenne, 0.23 in.; Cedar Keys, Fla., and Sumner, Cal., 0.24 in.; Fort Fred Steele, Wyo. Ter., and Graham, Tex., 0.25 in.; Deadwood and Fort Sill, 0.27 in.; Silver City, N. M., 0.28 in.; Fort Monroe, Va., and Breckenridge, 0.29 in.; Fort McHenry, Md., Gulf Hammock, Fla., 0.30 in.; Henrietta, Tex., Pembina, Dak., and Tulare, Cal., 0.34 in.; Punta Rassa, 0.35 in.; Fort Buford, Dak., 0.37 in.; Fredericksburg, Tex., 0.38 in.; Johnstown, Va., 0.40 in.; Weldon, N. C., 0.41 in.; Norfolk, 0.42 in.; Jacksboro and Decatur, Tex., 0.45 in.; Fort Garland, Col., 0.48 in.; Dover Mines, Va., 0.55 in.; Fort McKavett, Tex., 0.57 in.

Rainy Days.—The number of days on which rain or snow has fallen, varies as follows:—New England, 12 to 24; Middle Atlantic States, 2 to 15; South Atlantic States, 5 to 12; Eastern Gulf States, 3 to 14; Western Gulf States, 6 to 13; Lower Lake region, 17 to 25; Upper Lake region, 13 to 23; Ohio valley and Tennessee, 8 to 20; Upper Mississippi valley, 10 to 14; Missouri valley, 3 to 11; Red River of the North valley, 4 to 8; Eastern Rocky Mountain Slope, 2 to 8; Texas, 0 to 9; Rocky Mountains, 1 to 10; California, 3 to 10; Oregon, 12 to 16.

Cloudy Days.—The number varies in New England from 11 to 21; Middle Atlantic States, 2 to 14; South Atlantic States, 3 to 12; Eastern Gulf States, 3 to 14; Western Gulf States, 6 to 13; Lower Lake region, 11 to 26; Upper Lake region, 12 to 19; Ohio valley and Tennessee, 5 to 14; Upper Mississippi valley, 6 to 17; Missouri valley, 3 to 10; Red River of the North valley, 11 to 17; Eastern Rocky Mountain Slope, 3 to 8; Texas, 0 to 10; Rocky Mountains 2 to 12; California, 2 to 9.

Hail.—Ft. Sill, Ind. Ty., 16th; Ft. Gibson, Ind. Ty., 8th; Keokuk, N. C., 14th; St. Louis, Mo., 18th; Oswego, N. Y., 29th; Buffalo, N. Y., 23rd; Louisville, Ky., 5th; Indianapolis, Ind., 5th; Cairo, Ill., 14th; Logansport Ind., 5th; Burlington, N. H., 16th; Lyndon, Ill., 11th; Cresco, Nora Springs, Monticello, and Ft. Dodge, Ia., 26th; Ft. Madison and Ames, Ia., 27th; Iowa City, Ia., 29th and 30th; Monticello, Ia., 20th and 23rd; Ft. Dodge, Ia., 10th; Holton, Kan., 26th; Independence, Kan., 8th; Cedarville, Kan., 8th; Yates Center, Kan., 16th; Bowling Green, Ky., 28th; Fall River, Mass., 23rd; Grand Rapids, Mich., 3rd; 10th and 24th; Ypsilanti, Mich., 26th; Hudson, Mich., 15th; Oregon, Independence, and Pierce City, Mo., 27th; Somerville, N. J., 25th; Weldon, N. C., 19th; Cincinnati, Ohio, 17th; Jacksonburg, Ohio, 5th and 17th; North Lewisburg, Ohio, 14th; Dyberry, Pa., 27th; Embarrass, Wis., 19th; Red Bluff, Cal., 12th.

Snow fell frequently in the Lake region, Ohio valley, Middle States and New England, and in other regions on the following dates. In North Carolina, on the 19th and 20th, at Fayetteville, five inches fell, the first, so early in the season, for 35 years; South Carolina and Georgia, on the 19th; Upper Mississippi valley, from 1st to 5th, 15th, 17th to 24th, 26th, 27th and 28th; Middle Eastern Rocky Mountain Slope, on 1st, 2nd, 8th, 9th, 15th, 16th, 18th, 21st, 26th, 27th and 28th; North Rocky Mountain Slope, on the 1st, 2nd, 7th, 8th, 9th to 20th, 22nd, 25th to 28th; New Mexico, 8th, 10th, 11th, 16th, 17th, 18th, 27th and 30th; Middle Plateau District, 6th to 9th, 11th to 16th, 21st, 25th, 26th, 27th and 29th; California, at San Geronimo, four thousand feet above sea-level, on the summit of the San Bernardino range, on the 9th and 10th.

Largest Monthly Snow-falls.—Summit, Cal., 56.00 inches; Mt. Washington, 48.90 in.; Grand Haven, 26.40 in.; Grafton, N. H., 26.00 in.; Antrim, N. H., 24.20 in.; Emigrant Gap, Cal., and Pike's Peak 24.00 in.; Coutocookville, N. H., and West Charlotte, Vt., 22.00 in.; Hermosa, Cal., 21.50 in.; Little Mountain, Ohio, 19.40 in.; Strafford, Vt., 19.00 in.; Northport, Mass., 18.40 in.; Alpena, Mich., 18.30 in.; Rowe, Mass., 18.00 in.; Gardiner, Me., 17.50 in.; Cornish, Me., 17.00 in.; Truckee, Cal., 16.75 in.; Oswego, N. Y., 16.05 in.; Rochester, N. Y. and Woodstock, Vt., 16.00 in.; Nile, N. Y., 15.75 in.; Lima, N. Y., 15.60 in.; Clinton, Mass., 15.00 in.; Cleveland, Ohio, 14.70 in.; Palermo, N. Y., 14.25 in.; Coldwater, Mich., 14.00 in.; Westborough, Mass. and Kalamazoo, Mich., 13.50 in.; Penn Yan, N. Y., 13.00 in.; Hudson, Ohio, 12.90 in.; Buffalo, N. Y., 10.80 in.; Orono, Me. and Starkey, N. Y., 10.00 in.

The *depth of snow on surface of ground at end of month*, was reported as follows: In Utah at Coalville, from a trace to $\frac{1}{4}$ inch; in Montana at Ft. Custer, one inch; in Dakota at Ft. Stevenson and Pembina, and in Minnesota at Breckenridge and St. Paul a trace; in Nevada at North Platte, trace to one inch; in Iowa at Nora Springs a trace, and at Ft. Madison and Davenport, half an inch; in Wisconsin at Madison, half an inch, and at Beloit, Milwaukee and Embarrass, one inch; in northern Illinois and Lyndon, one, and at Riley one and a half inch; in Michigan at Litchfield, half, at Thorntown, Hudson and Grand Haven one, at Kalamazoo, $1\frac{1}{2}$, at Escanaba, $1\frac{1}{2}$ inch, and at Alpena, 5 inches; in New York at Oswego, Waterburg and Albany, a trace, at Rochester, $\frac{1}{4}$ inch, and at North Valney, $\frac{1}{2}$ inch; in Vermont at Strafford, 1 inch; and in New Hampshire on the summit of Mt. Washington 1, and at Grafton 2 inches; on the summit of Pikes Peak, Col., from 5 to 60 inches.

Snow from a cloudless sky.—Burlington, Vt., 6th.

Drought continued in the states of New York, New Jersey, West Virginia, Maryland, Virginia, North Carolina and Texas, and is commented upon as follows: In New York at Port Jervis on the 7th the continued dry weather was causing considerable alarm. Throughout southern part of New Jersey such an extended drought as the present has not been known for many years; on the 29th wells had given out and springs were dried up that were never known to fail before; mills have been compelled to stop or greatly curtail operations. In Maryland at Fallston and Sandy Springs month dry throughout, springs and wells failing. In West Virginia at Morgantown, on the 24th, farmers and river men were complaining and wells drying up, &c. In Virginia at Petersburg, on the 11th, the dry and mild weather had caused the wells to dry up, mills were compelled to stop running, and farmers had to come a distance of 50 miles to procure bread-stuff and have their grain ground; at Snowville, month very dry; Dover Mines, drought throughout month causing a great scarcity of water. In North Carolina at Weldon, month remarkably dry, severe drought from the 1st to the 14th, during which time wells failed; in the Dismal Swamp region, swamp fires continued, no rain having fallen for two months. In the southern part of Texas the drought has been severely felt; the observers at Fredericksburg, Boerne, Uvalde, Graham and Coleman report stock suffering severely and farmers unable to sow seed. In Erath county, Texas, on the

8th, the earth of the prairies was cracked so as to make it dangerous to ride across them. The last rain fell here on the evening of July 29th. In Hood county, Texas, the drought and dust were extremely bad; on public roads the dust was a foot in depth. The *Springfield Daily Union* (Ills.) of November 24th states that the "drought in some parts of the west was so severe that water was carried from the Mississippi river at Louisiana, Mo., both east and west into Illinois and Missouri for a distance of 75 miles and nearly all railroads running from the river to the interior had a water train."

Floods.—Kansas City, Mo., on the 13th the Kaw river rose five feet in 24 hours, "heaviest freshet ever known" at that place.

RELATIVE HUMIDITY.

The percentages of mean relative humidity for the month range as follows: New England, 69 to 83; Middle Atlantic States, 59 to 75; South Atlantic States, 61 to 77; Eastern Gulf States, 66 to 79; Western Gulf States, 58 to 75; Ohio valley and Tennessee, 59 to 69; Lower Lake region, 70 to 77; Upper Lake region, 67 to 82; Upper Mississippi valley, 63 to 69; Lower Missouri valley, 52 to 73; Red River of the North valley, 77 to 84; Northern Rocky Mountain Slope, 48 to 56; Texas, 16 to 88; Western Plateau, 47 to 64; California, 61 to 73; Oregon, 78 to 86. *High stations* report the following averages, not corrected for altitude: Mt. Washington, 90.4; Pikes Peak, 52.7; Santa Fe, 46.7; Denver, 49.3; Cheyenne, 39.7; Virginia City, 56.8.

WINDS.

The prevailing winds, at Signal Service stations, are shown by the arrows, flying with the wind, on Chart No. II. The general direction along the Atlantic coast has been northerly, but at the interior stations, Atlanta, Augusta, Charlotte, Lynchburg, Albany and Burlington, and thence to the Southwest, Missouri, Illinois and Michigan, southerly. North and west of this region northwesterly winds predominated. On the Pacific coast they were southerly at Portland and Olympia, and northerly in California. Below are given some of the maximum velocities, in miles per hour, and some of the larger and smaller total monthly movements, registered at the Signal Service stations:

Maximum Velocities of Winds.—3rd, Thatcher's Island, E., 64 miles per hour; 6th, Ft. Custer, NW., 48; 9th, San Francisco, SE., 36; 10th, Key West, NW., 36; 11th, Red Bluff, SE., 42; Winnemucca, SW., 45; Salt Lake City, S., 28; th, Cheyenne, W., 48; Denver, NW., 34; North Platte, W., 54; Cairo, SW., 56; 16th, Dodge City, N., 48; 17th, Coleman, Tex., N., 48; 18th, Kittyhawk, N., 50; Indianola, N., 52; Galveston, N., 38; 19th, Ft. Stevenson, Dak., W., 60; Bismarek, N., 46; Pembina, NW., 40; St. Paul, NW., 46; Madison, NW., 40; Grand Haven, W., 42; Punta Rasa, NW., 46; 20th, Cape Henry, NW., 52 miles; Cape May, NW., 83; Sandy Hook, NW., 60; Sandusky, NW., 62; Morgantown, NW., 45; Atlanta, NW., 36; Cape Lookout, NW., 46; Albany, NW., 44; 24th, Breckenridge, NW., 44; 25th, Virginia City, NE., 36; 26th, Sacramento, N., 36; 28th, Pike's Peak, N. 80; Wood's Holl, S., 40; 29th, Cape May, NW., 50; 30th, Mt. Washington, NW., 108.

Total Movements of the Air.—The following are the largest total movements recorded in miles at the Signal Service stations, during the month: On the summit of Pikes Peak, 18,192 miles; Cape May, 14,347; Portsmouth, N. C., 12,103; Thatcher's Island, 12,068; Sandusky, 11,940; Cape Lookout, 11,561; Kittyhawk, 11,396; Sandy Hook, 11,367; Cape Henry, 10,642; Wood's Holl, 10,416; Indianola, 10,052; Erie, 10,056; Cape Hatteras, 9,938; Cleveland, 9,809; Key West, 9,589; Barnegat, 9,231. On the summit of Mt. Washington the working of the anemometer was interfered with by frost-work. The *smallest* are, Visalia, Cal., 1,457 miles; Socorro, N. M., 1,596; Deadwood, Dak., 1,659; La Mesilla, N. M., 1,744; Salt Lake City, 2,222; Lynchburg, 2,312; Nashville, 2,646; Uvalde, Tex., 2,652; Augusta, 2,781; Virginia City, 2,858; Ft. Davis, Tex., 2,888; Cedar Keys, Fla., 2,953; Dubuque, 2,976.

Local Storms.—Pageville, Cass co., Mo., 8th, 2:15 p. m., a severe tornado passed over the town from the southwest, destroying the depot building of the Pacific railroad, several stores and dwellings and a blacksmith's shop, all which was done in less than one minute. Several persons seriously and two fatally injured. An empty wagon, team and driver were carried about 100 yards. Near Fort Smith, Crawford, Co., Ark. 8th, about 3 p. m. a severe tornado accompanied with hail, (stones 2 or 3 inches in diameter,) passed to the northeastward. "The storm cloud looking like black smoke from a large furnace and its shape was like a funnel with its inside red as fire; the roaring was terrible and the cloud was filled with pieces of timber, branches of trees and fragments of clothing; everything was swept clean over the path of the storm which was very narrow; one person killed and several seriously injured." Detroit, Mich., 12th, 5 p. m. "a very destructive 'tornado' visited the northwestern part of the city, creating considerable havoc. The sky suddenly became overcast, a gale sprung up from the west and southwest which soon reached the velocity of a hurricane and swept houses, fences, gates &c. before it, the path was not over 500 feet wide." Rapids Parish, La., 14th, 'on Elmwood plantation, ten miles below Alexandria, twelve buildings were destroyed by a severe tornado. The track of the storm was about 250 yards wide and swept all objects before it; no lives were lost; the plantation bell weighing 300 pounds and numerous ploughs and parts of wagons were lifted up and transported long distances; entire loss estimated at \$10,000.' In Ouachita Parish, La., probably on the 14th, 'a tornado passed over Fisher's Landing, on Black river, destroying two or three houses and injuring several people.' Cairo, Ill., 14th, a "tornado, accompanied by hail and heavy rain struck the city at 1 p. m., demolishing several buildings and unroofing many others; one child was blown some distance and killed." Terre Haute, Ind., 14th, a. m., a violent wind and rain storm passed to the northeast, a